Minimally Invasive Removal of Nonmobile Zygomatic Dental Implants Affected by Peri-Implantitis and Chronic Sinusitis

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INTRODUCTION

Zygomatic dental implants are indicated in patients with severe bone atrophy of the maxilla. They are long implants that are anchored in the zygomatic bone and require well-training.[1] Immediate loading of zygomatic implants would restore the atrophied maxilla in a very short time. Several systematic reviews have analyzed the outcomes of zygomatic implants. Chrcanovic et al have reported a 12-year cumulative survival rate of 95.21%, indicating a high predictability.[2] However, several complications of zygomatic implants have been reported like sinusitis, gingival infection around the implants, paresthesia, and oroantral fistulas.[2]

The failure of nonmobile zygomatic implants would be a challenging situation.[2] In one study, the surgical removal of zygomatic dental implants has resulted in a significant loss of bone.[3] There is no report on the use of the counter-torque technique to remove zygomatic implants. The application of a shear stress at the implant–bone interface has been effective in the atraumatic removal of failed dental implants.[4] The objective of this case letter is to present the clinical outcomes of the counter-torque technique in the explantation of a nonmobile zygomatic implant.

CASE DESCRIPTION

A 62-year-old male patient attended the clinic complaining of unusual taste and referred to several episodes of inflammation in the upper right side of the mouth. The medical history revealed no data of relevance. The dental history indicated the presence of implant-supported prosthesis in the upper jaw.

Clinical examination revealed the presence of hybrid prosthesis supported by two implants at the position of upper right second premolar and the upper right first molar. The implant at the position of the upper right first molar was a zygomatic implant. A cone-beam computerized tomography (CT) scan indicated the presence of sinusitis affecting the right maxillary sinus and oroantral communication (Figure 1). The patient received repeated antibiotic therapy of the chronic sinusitis over a year in another clinical center.

After removing the prosthesis, we observed the presence of mucosal fenestration exposing part of the zygomatic implant, an inflamed periimplant mucosa with puss discharge, and a deep pocket depth (Figure 2). This implant was diagnosed to have periimplantitis. A treatment plan was proposed that included the removal of the dental implants and the granulation tissue within the maxillary sinus. The patient delivered a signed informed consent.

Patients received 2 g of amoxicillin and 1 g of acetaminophen 60 minutes before surgery. Under intravenous sedation, local anesthesia was achieved with articaine hydrochloride with epinephrine (1:100 000). A crestal incision was practiced to elevate a full-thickness flap and expose the surgical site. This permitted the observation of crater-like bone defect and granulation tissue around the implant. Plaque-like deposits were also evident on the implant surface (Figure 3).

Implant explantation was carried out using an extraction kit. For that, an extractor (Number 1) was first engaged into the implant connection (BTI Biotechnology Institute, Vitoria, Spain) (Figure 4). The removal torque was exerted by a wrench in counterclockwise direction maintaining a perpendicular position of the assembly in relation to the implant platform. Figures 5 and 6 show the effectiveness of the technique in removing the failed nonmobile zygomatic implant (the counter-torque value was 180 Ncm) and preserving the available bone tissue. Through the explantation socket, sinus debridement was performed to remove the granulation tissue and the inflamed mucosa. A new implant was placed at the position of the upper right second molar.

Transepithelial abutments (Multi-Im, BTI Biotechnology Institute, Vitoria, Spain) were connected to the new implant. The Nobel Biocare implant at the position of the second right premolar was connected to a compatible transepithelial abutment (BTI Biotechnology Institute). This resulted in having the same prosthetic platform at both implants. Provisional titanium cylinders were then screwed to the abutments. These cylinders had knobs to support the prefabricated titanium bar. The length of the bar was adapted to the distance between the two sleeves and was fixed (outside the patient mouth) with an adhesive. This metallic frame was then sent to the prosthetic lab to add the resin base and teeth (Figure 7). The provisional

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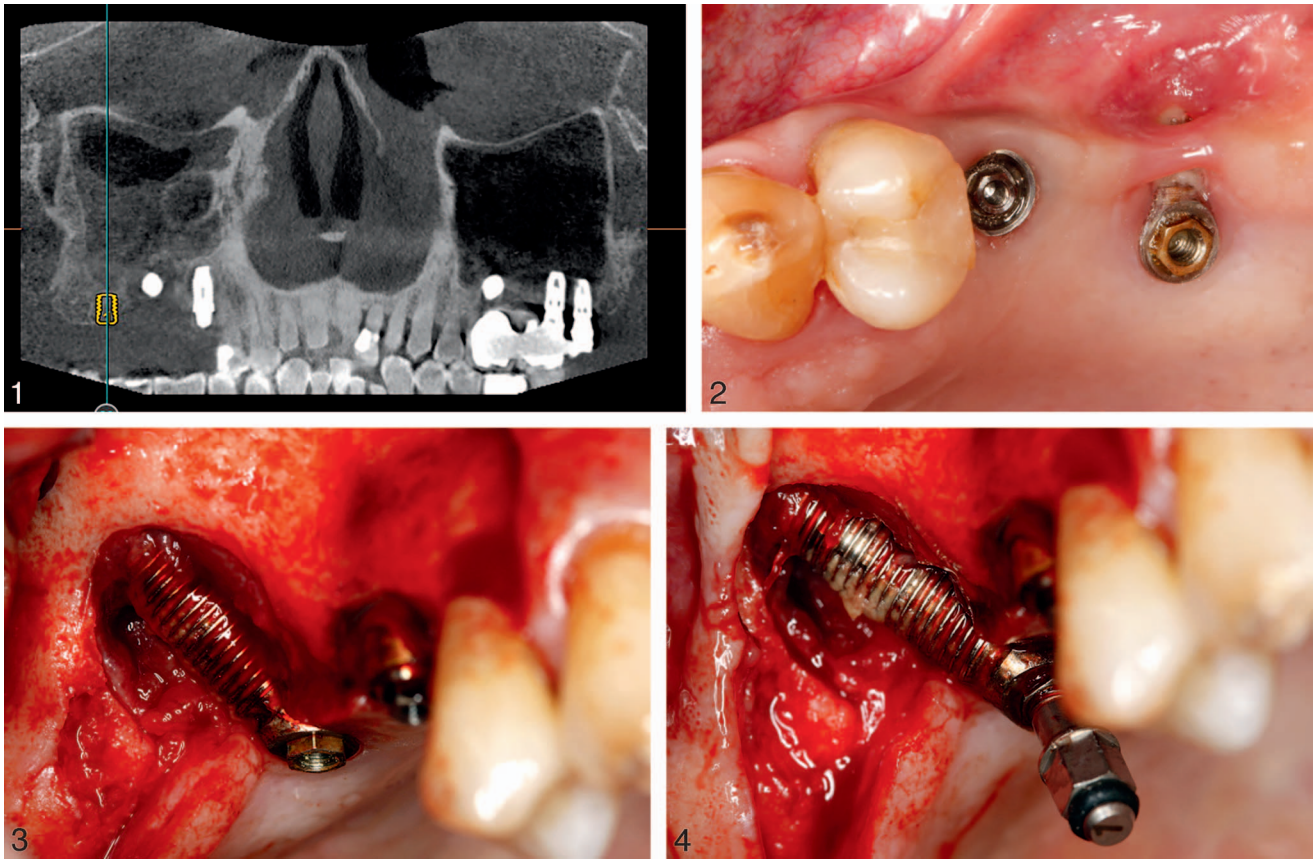
DOI: 10.1563/aaid-joi-D-17-00102



Figures 1–4. Figure 1. Cone-beam computerized tomography scan showing the bone destruction around the zygomatic implant at the position of the upper right first molar. The presence of sinusitis and oroantral communication could be also observed. **Figure 2.** Preoperative clinical photographs showing the presence of mucosal fenestration exposing part of the zygomatic implant and an inflamed peri-implant mucosa with puss discharge. **Figure 3.** Clinical photograph showing the presence of crater-like bone defect and the presence of granulation tissue. Plaque-like deposits were evident on the implant surface. **Figure 4.** The insertion of extractor into the implant connection to transmit the counter-torque force to the implant.

prosthesis was connected to the implants in the next day of surgery. Six months later the definitive prosthesis was delivered (Figure 8). The 1-year visit indicated the absence of complications.

Discussion

Several methods have been described to remove nonmobile dental implants like trephining bone, the use of thin bur to separate the implant from bone, the induction of a localized thermonecrosis and the counter-torque technicque.[4,5] The counter-ratchet technique has been the most effective in preserving the available hard and soft tissues.[5]

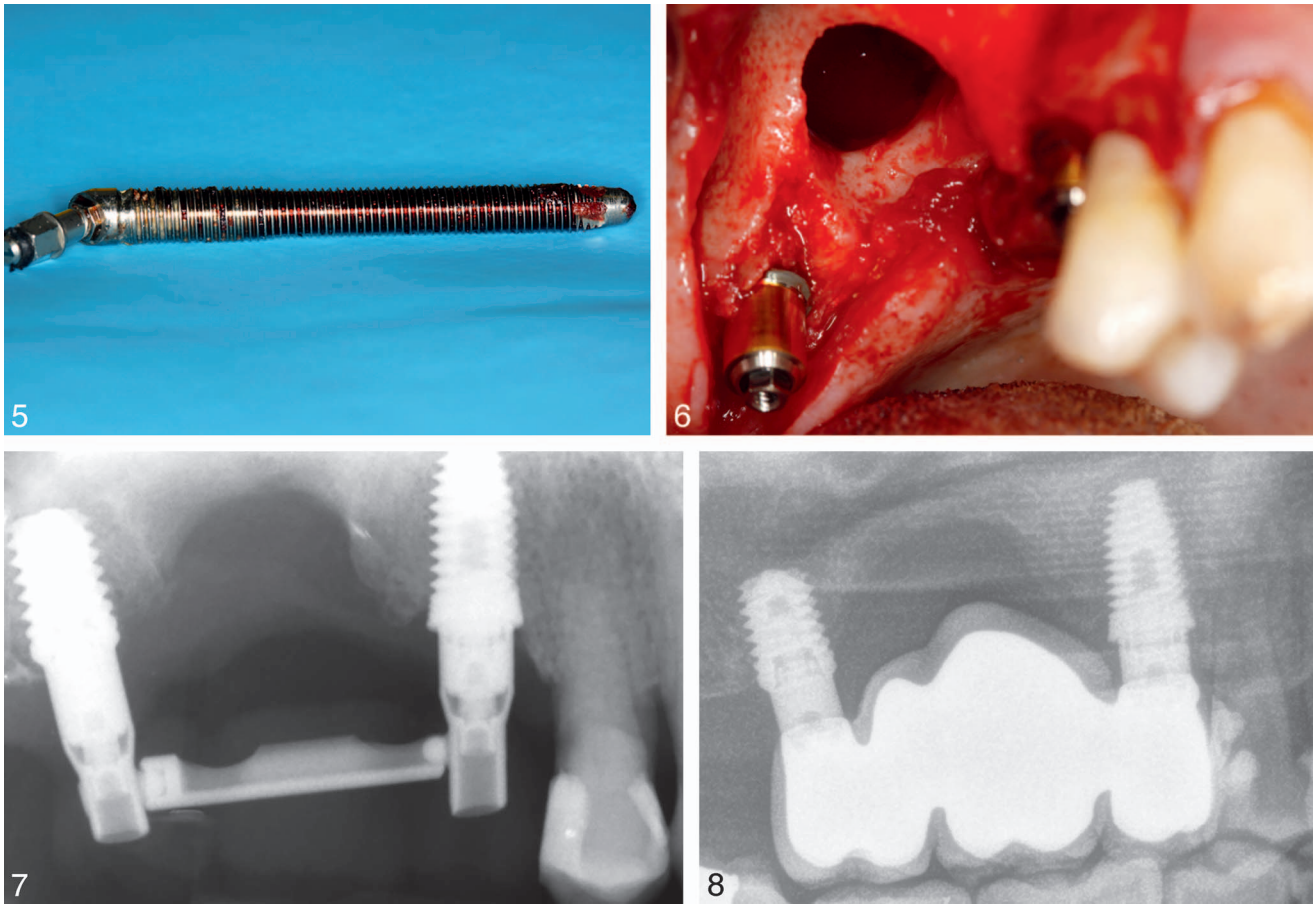
In this case letter, the zygomatic implant failed due to periimplantitis. Peri-implantitis is an inflammatory process around an implant, which includes both soft tissue inflammation and progressive loss of supporting bone beyond biological bone remodeling.[6] Advanced stages of periimplantitis would result in severe bone loss and indicate the need for implant removal.

Zygomatic implants are placed when insufficient alveolar bone is available. This would emphasize the importance of preserving the available bone tissue when removing failed zygomatic implants. In this case letter, the counter-torque technique has been effective in removing nonmobile zygomatic implants and minimizing complications. Nowadays, the practice of minimally invasive surgery is increasing and would reduce surgical complications and surgical morbidity, preserve available oral tissues, and also save time and costs.[7]

The technique followed in this study presents a minimally invasive alternative for the removal of failed zygomatic dental implants. This study was limited by the retrospective design and data dependency on the accuracy of the patient's record. This is a case letter with a limited sample size. Further prospective studies with a higher sample size are required.

Note

EA is the scientific director of BTI Biotechnology Institute (Vitoria, Spain). He is the head of the Foundation Eduardo Anitua, Vitoria, Spain. MHA is a scientist at BTI Biotechnology Institute (Vitoria, Spain).



Figures 5–8. Figure t. The extracted zygomatic implants. **Figure 6.** Clinical image shows remaining bone defect and the effectiveness of the counter-torque technique in preserving the available bone tissue. The explantation alveolus permitted the surgical debridement of the chronic sinusitis. **Figure 7.** A radiograph showing the placement of the provisional prosthesis for the immediate loading of the dental implant. **Figure 8.** The definitive implant-supported prosthesis after 6 months of surgery.

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